REGION 6 EXECUTIVE SUMMARY

TOPIC: Fansteel (FMRI) Site – Muskogee, Muskogee County, Oklahoma

DATE: May 19, 2020 CONTACT: David Robertson, OSC

PURPOSE/ACTION NEEDED: Information Update

DEADLINE DATE: N/A

BACKGROUND:

Fansteel (FMRI) is a 110-acre site bound to the east by the Arkansas River (Webber Falls Reservoir), to the south by the East Shawnee Bypass, to the west by the Muskogee Turnpike, and to the north by undeveloped land owned by the Muskogee City-County Port Authority. The remaining surrounding area consists of a state college, industrial/commercial properties, and residential properties. Fencing secures the Site but can be accessed through a main entrance on the western boundary of the property. Tribal concerns will be an important part of any removal action at this location as the Cherokee nation and Muscogee (Creek) nation, are within a four-mile radius of the Site.

Fansteel operated a metal processing facility at this location which produced tantalum and columbium metal products from 1956 to 1989. The raw material (ore) used for tantalum and columbium production contained uranium and thorium as naturally occurring trace constituents. The concentrations of natural uranium and natural thorium were sufficient to cause the ores and slags to be classified as source materials by the Atomic Energy Commission (AEC), which originally issued License No. SMB-911 in 1967 to Fansteel, Inc.

In August, 2018, EPA conducted a removal action to dispose of one tank of ammonium hydroxide (estimated to contain 3,000 gallons) and the contents of an on-site wet chemistry laboratory. In April, 2019, EPA conducted an Expanded Site Investigation (ESI) to evaluate the site for listing on the National Priorities List. In July, 2019, EPA conducted a gamma radiation survey of the property to assess the need for further removal actions.

CURRENT STATUS:

Fansteel formed a separate subsidiary, FMRI, for the sole purpose of Site cleanup and decommissioning. Fansteel is out of funds and can no longer finance cleanup of the site. FMRI has funding to manage the site as is through 2023, assuming no unusual expenses are encountered. Oklahoma is an “agreement state” for NRC licenses, however, this site was explicitly excluded from the agreement. Therefore, Oklahoma does not have financial responsibility for an NRC cleanup.

The Removal Program initiated a removal assessment in May 2020 to review the data from historical investigations by the NRC, ODEQ, and EPA and collect additional data at the site. The purpose of the assessment is to evaluate the feasibility of additional removal actions that could be taken at the site.

ENVIRONMENTAL/PUBLIC HEALTH CONCERNS:

The April 2019 ESI confirmed a TCE plume on the north side of the property and elevated metals and radioactive isotopes in several areas throughout the property, including groundwater. A search of the Oklahoma Water Resources Board (OWRB) database showed fifty-four privately owned wells within a 4-mile radius of the property boundary and seven within 1-mile. The nearest domestic well is located 0.45-mile northwest of the property boundary. The groundwater quality in the immediate vicinity of the site is considered poor to fair with yields not significant enough for use.

The July 2019 gamma radiation survey of the property identified several radioactive hotspots.

TECHNICAL CONCERNS:

- NRC estimated cleanup cost at approximately $78 million (2015 dollars)
- Depending on disposal costs, soils contaminated with radioactivity and heavy metals may be stabilized in temporary on-site storage
- The EPA team met with NRC on June 2, 2020. The NRC team stated that EPA can move contaminated soils on-site under the existing FMRI license if actions will reduce the likelihood of dispersion, and/or reduce worker and public exposure
- On-site storage of contaminated material should meet the NRC criteria for ALARA (As Low As Reasonably Achievable) and must be temporary only.
- EPA movement of material on site will require letters of agreement between EPA and NRC at a minimum or potentially, a revised EPA/NRC MOU.
- According to NRC, ODEQ has been averse to storage of radioactive material on-site at other nearby facilities
- On-site wastewater ponds need to be stabilized to reduce the likelihood of a release of contaminated water and soils to the Arkansas River
- The groundwater interceptor trench and the wastewater treatment system need to be maintained to prevent groundwater contaminated with radioactive isotopes from entering the Arkansas River. The trenches and wastewater system need to be modified or closed to reduce the amount of contaminated groundwater requiring management.
- EPA is evaluating the feasibility and cost of both a groundwater barrier wall around the site (preventing groundwater from entering or leaving the contaminated area) or a permeable reactive barrier (to chemically alter the groundwater causing the radiological isotopes to drop out of solution).
- Additional data collection activities have been postponed due to the COVID-19 Pandemic.

COMMUNITY CONCERNS:

- The Cherokee nation and Muscogee (Creek) nation, are within a four-mile radius of the Site.
- ODEQ is involved with all aspects of both the Remedial and Removal actions.

FANSTEEL/FMRI SITE REMOVAL OPTIONS
(see attached Figure for locations)

Former Pond 2 - The open trench had the highest gamma readings noted during the July 2019 survey (45X background). Evaluating location for use as a temporary repository for all on-site radioactive material. Evaluation includes suitability of this site compared to others on-site; likelihood of inundation and or damage from flooding; potential to use in-situ treatments to reduce isotope mobility (like lime for example); and protection of groundwater and surface water and other factors.

- Estimated dimensions of the Former Pond 2 trench are 200 ft x 100 ft x 8 ft. The actual dimensions and liner type (clay) need to be verified. Approximately 6,000 cubic yards of material from the site could be placed in this area and capped temporarily with HDPE at $60,000 to $80,000

Sodium Reduction Building - Contains 1000-2000 one ton "supersacks" of soil contaminated with isotopes of uranium and thorium. The way the bags are stacked, and the potential condition of the bags will need to be evaluated before a plan to sample or move them can be created. ODEQ staff have expressed concern regarding tornadic activity at the site dispersing contents of sacks. Currently evaluating:

- Safety of material at its current location; do we need any engineering controls (results expected within a month of returning to field work)
- Move material to a temporary on-site repository at the most suitable location as determined by the current study material could be placed in Former Pond 2 trench at a cost of approximately $30,000-$50,000. Assumes moving the supersacks at a cost of $15/yard (2,000 cubic yards x $15/yard)
- Off-site disposal to White Mesa, UT (2,000 miles RT) is estimated at $1,675,000. This is based on 170 loads of material disposal at $275/ton disposal; unload/decon fee of $1,000/ load; mileage at $2/mile.
- WCS in Andrews, TX is 600 miles RT currently under study

Soil Stockpile - This soil was collected from french drains around now closed ponds. The July 2019, gamma survey indicated 27X background gamma radiation. The stockpile is covered above and below with an HDPE liner. Options:

- Cover old liner with sand to smooth and cover all with new upper HDPE liner (estimated cost $68,000 - $80,000)
- Determine if this soil is suitable to close the existing open trench at the Former Pond 2 trench; making that a defacto temporary on-site repository. Estimated dimensions of the soil stockpile are 200 ft x 150 ft x 15 ft or 17,000 cubic yards but this is very conservative. Need to verify, but placement in Former Pond 2 trench may not be feasible due to volume

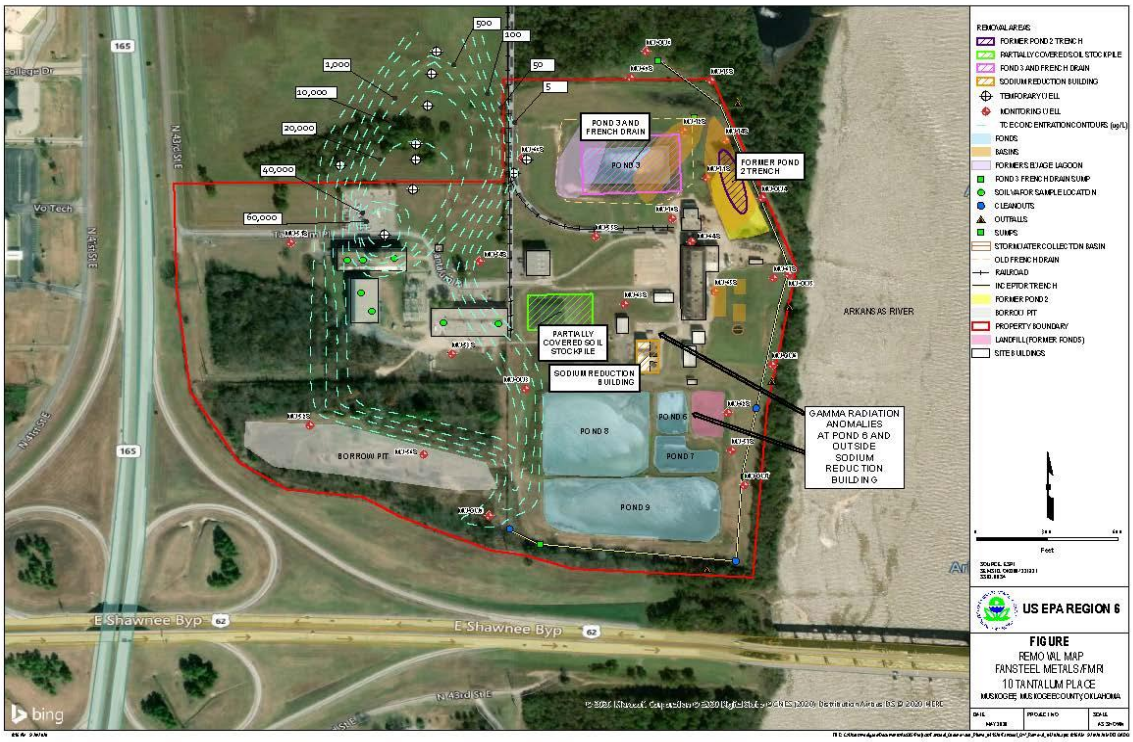
- Ship off-site for disposal (cost estimate expected next week)
- Off-site disposal to White Mesa, UT (2,000 miles RT) is estimated at $11,675,000. This is based on approximately 1,400 loads of material at $275/ton disposal; unload/decon fee of $1,000/load; mileage at $2/mile
- WCS in Andrews, TX is 600 miles RT, this option is currently under study

Additional Data Collection Needed: Gamma Anomalies were identified at Pond 6 and outside Sodium Reduction building. Evaluate source of gamma radiation and develop plan to move radioactive isotopes to a temporary on-site repository.

- Excavating and moving soil around the site can be accomplished at about $10/yard. This material could be placed in Former Pond 2 trench

Additional Data Collection Needed - Groundwater and Surface Water Treatment: The facility uses a trench and sump treatment system to capture groundwater from an unconfined alluvial aquifer. The system captures approximately 14,000 gallons per day (gpd). The system is designed to treat metals only and treatment is by manual addition of lime to raise pH and drop metals into several settling ponds set in series. In addition, the facility is under order from the NRC to treat surface and groundwater prior to discharge under a NPDES permit (NPDES Permit requirements attached). This treatment includes partially closed Pond 3 and its associated french drain which contributes 15,000 gpd to the treatment system (approximately ½ of all wastewater treated comes from the Pond 3 area). WIP has been removed from Pond 3. The pond still contains residual radioactive isotopes, chromium, cobalt, manganese, zinc and mercury. Currently studying site to evaluate:

- Closing and capping Pond 3 to potentially reduce generation of contaminated groundwater
- Evaluating whether treatment system is capturing chlorinated solvents and if so, is system adequate to treat
- Upgrading antiquated manual treatment system.
- Treatment and collection system are under study



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